

Numerical Criteria

Aquatic Life and Human Health

Summary of Changes

Aquatic Life Criteria

- Cadmium, Diazinon, Lead, Nonylphenol, PCB, Selenium, Silver, TBT

Human Health

- EPA 2000 Human Health Methodology
- Other Human Health Criteria (Dioxin, Mercury Fish Tissue, Radionuclides)

Aquatic Life Draft Amendments

- Revise Cadmium based on EPA 2001 304(a) published criteria
 - Acute 3.9 µg/l to 2.0 at 100 hardness
 - Chronic 1.1 µg/l to .25 at 100 hardness
 - 24 hr acute averaging period
 - Hardness based conversion factors
- Add Diazinon published as EPA 304(a) criteria in 2005
 - FW Acute .17 Chronic .17
 - SW Acute .82 Chronic .82

Aquatic Life Draft Amendments

- Revise Lead SW and FW VA specific recalculated criteria with conversion factors
- PCB congeners moved to PCB Total
- Add Nonylphenol published as EPA 304(a) criteria in 2005
 - FW Acute 28 Chronic 6.6
 - SW Acute 7.0 Chronic 1.7

Aquatic Life Draft Amendments

- Revise Selenium SW Acute to match EPA 304(a) criteria 300µg/l to 290. Freshwater expressed as total recoverable.
- Revise Silver SW Acute to match EPA 304(a)
 - Acute SW 2.0 µg/l to 1.9
 - No change to FW acute – unknown where adjusted EPA factor of 6.59 in hardness equation came from (CA Toxics Rule uses 6.52 which is what VA has)

Aquatic Life Draft Amendments

- Revise TBT based on EPA Dec 2003 304(a) published criteria (non-priority pollutant)
 - Chronic FW .063 µg/l to .072
 - Acute SW .38 µg/l to .42
 - Chronic SW .001 µg/l to .0074

Miscellaneous Aquatic Life Amendments

- Saltwater concentration X WER
- WER = 1 unless otherwise determine in subsection F (does not need to be published first as a site specific criterion in section 310)
- Chlorine Produced Oxidant moved to Chlorine
- Total concentration alpha and beta-endosulfan shall not exceed aquatic life criteria.

Aquatic Life Amendments

Summary of the Basis of the Criteria

- 40 Aquatic Life Criteria
- 6 based on Red Book or Gold Book
- 5 based on state specific studies
- All others based on published 304(a) including 1995 Updates
- 13 are non-priority pollutants
- All dissolved criteria use conversion factors except saltwater copper

Aquatic Life Amendments not Included

No Updates to Ammonia Criteria

- **Grumbles Feb 22, 2007 letter to Environmental Law and Policy Center (criteria re-evaluation per E&T consultation, stressors and key recovery needs, ammonia instream exposure analysis)**
- **Review of USFWS Submitted Data**
 - Acute and Chronic testing results on mussels
 - ASTM new acute methods published and used (Acute)
 - Acute tests for glochidia and juvs indicates acute WQC protective except for 10 day test (in between acute and chronic type test)
 - Chronic new data indicates criteria may not be protective
 - Fatmucket and Wavy-rayed chronic value below VA chronic ammonia (.37 vs .9 and .67 vs 1.26)
- **Comments received from ad hoc, NCASI, summary of mussel toxicity testing workshop and abstracts**

Aquatic Life Amendments not Included

No Updates to Copper Criteria

- **Biotic ligand model for copper published Feb 22, 2007**
- **Review of USFWS Submitted Data**
 - Acute and Chronic Testing on Mussels
 - ASTM new acute methods published and used (Acute)
 - Acute 6 and 24 hr EC50s (except Ellipse) greater than 1-hour VA WQC indicates that acute WQC may be protective
 - Chronic new data indicates criteria may not be protective
 - Fatmucket, Rainbow and Oyster chronic values below VA chronic copper (9 vs 14 (approx.))
- **Comments received from ad hoc, summary of mussel toxicity testing workshop and abstracts**

Human Health Methodology

EPA 2000

- General values
 - Average body weight 70 kg
 - Fish ingestion rate .0175 kg/day
 - Water ingestion rate (water supplies only) 2 L
 - Extra cancer risk (for carcinogens only) (1 in 100,000 or 10^{-5})
 - Relative Source Contribution (20% exposure from fish)
- Contaminant Specific Toxicity Values:
 - Carcinogen : oral slope factor ($q1^*$) updated when necessary
 - Noncarcinogen: reference dose (RfD) updated when necessary
 - Bioconcentration factor (BCF) for converting fish concentration into a water concentration (no updates released)

2000 Methodology Results in a Lower Criterion

- Increased fish ingestion rate results in a 63% reduction in criterion concentration
- Relative source contribution results in a further 80 % reduction in criterion concentration

Human Health Amendments

- 14 human health criteria use EPA's 2000 Human Health Methodology w/ RSC
 - Antimony, Thallium, Cyanide, Chlorobenzene, 1,1-Dichloroethylene, Ethylbenzene, Toluene, 1,2-Trans-Dichloro-ethylene, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Hexachlorocyclo-pentadiene, 1,2,4-Trichlorobenzene, Gamma-BHC (Lindane), Endrin

Human Health Amendments

- Human health criteria use EPA's 2000 Human Health Methodology w/ Fish Intake Value of .0175
 - 77 Parameters
- Acrolein, chloroform, phenol, toluene per IRIS recommendations (either updates since May 2002 or IRIS recommendation that q1* was not applicable (chloroform)).

Human Health Amendments

Exceptions to the Methodology

- **Barium, Arsenic, Cadmium, Chromium, Copper, Lead, Radionuclides, Silvex**
 - Primary MCLs or Action Level (Lead)
 - Arsenic Under Reassessment at EPA
- **Foaming Agents, Manganese, Nitrite, Sulfate, TDS**
 - Secondary MCLs
- **2,4 Dichlorophenoxy acetic acid (2,4-D), Iron, Methoxychlor**
 - Red Book 1976 Gold Book 1986
 - Non-priority pollutants

Human Health Amendments

Exceptions to the Methodology

- **Nickel does not match EPA methodology but matches 2006 304a pollutant list**
 - Under reassessment at EPA
- **Kepone, Mirex**
 - Zero, agency policy decision
- **Dioxin**

Human Health Amendments

Exceptions to the Methodology

- Dioxin criteria development approved by VDH, EPA and legal ruling in 1990.
- Difference is in choice of q_1^* (FDA=17500 mg/kg/day) and used old methodology (FI 0.0065 kg/day).

Human Health Amendments

- Mercury fish tissue value .30 mg/kg/day
- Will replace water column numbers for PWS and all other state waters
- No EPA implementation reference

Miscellaneous Human Health Amendments

- Barium, Arsenic, Cadmium, Copper, Lead—Dissolved or total not specified (Cr = total)
- Radionuclides – PWS only plus uranium
- Did not add more non-priority pollutants unless published under Guidelines (nonylphenol, diazinon, TBT)
- Did not add more MCLs
- Chlorides do not apply in transition zones (currently naturally impaired)
- Did not add Human Health Temperature

